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THE LLAMA AS A PACK ANIMAL

by  
Jim Hook



**United States  
Department of  
Agriculture**

**Forest  
Service**

## Arapaho and Roosevelt NF

Sophia

## 2350 General Forest Environment Areas

Date: December 18, 1980

## **Subject: The Llama as a Pack Animal**

To: District Rangers (except Estes-Poudre)

Enclosed is a report prepared by Jim Hook on the use of a llama to support trail maintenance. Jim is the trail maintenance crew foreman for the Estes Poudre District.

*John Teller*

A.G.M. TALBOT  
Acting Forest Supervisor

**Enclosure**



**LIBRARY COPY**  
**ROCKY MOUNTAIN FOREST & RANGE**  
**EXPERIMENT STATION**

## INTRODUCTION:

1

The Estes-Poudre trail crew has traditionally been a backpack based crew. The schedule has been 5 days working and 2 days off. Along with maintenance tools like pulaskis, shovels, chainsaw (and the last 2 years, 2-man bucksaws), pruners, signs and whatever else, the crew has had to carry safety equipment, radios, tents, sleeping bags, clothes, water and food. With a 5-day week and 2-person crew an individual has had to walk and work with from 60 to 80 pounds of equipment. Most items are essential for work or safety so in order to lighten a pack crew members had to lighten their food load.

This season the trail crew tried an experimental schedule of 10 days working and 4 days off. This was initiated in an effort to maximize time on the trail, allow crews a longer time to recuperate from the trail, and to reduce milage for pickup and dropoff trips. However, to accomplish this, more food had to be carried and load weights were pushed up even higher. As much or more energy was expended carrying equipment than in actually maintaining the trails. June was unseasonably hot and the crews incurred dehydration and weightloss. I personally lost 20 pounds I had not intended to lose.

The first half of the summer the crews worked around Estes Park and carried these loads as best they could. However, after July 1st I was allowed to use a llama I've been working with to help with the load. A volunteer and I used the llama the first 10 days out and the other crew continued to carry all their equipment. After that the other crew minus one joined us and three of us worked with the llama. The llama belongs to Mr. Stan Ebel of Rt. 1 Box 40, Edison, Nebraska, 68930. Phone number 308-927-2676. Mr. Ebel allowed me to use his animal for no charge to see how well the llama is suited for this job.

The following is my daily log, comments and evaluation, and various other information on this trial period.

## LLAMA LOG:

July 2- Hauled Burrito first to Buckhorn and then on to the north trailhead of the Signal Mtn. Trail. I had packed his pack previously with Graefe's and my food. The llama can easily jump from the back of the pickup on any surface. I have a rug on the bed of the truck which provides better traction for him when he jumps. It was a little hard putting on the loaded pack, so in the future we will load the pack after we put it on him. There is no good place to cross the first drainage with an animal. We looked for a place but finally just forged across. Burrito was able to jump a downed aspen 2 foot off the ground and <sup>an</sup> adjacent ditch. I had previously worked with him on stream and bridge crossings, so he followed in my tracks as I crossed the first bridge. We hiked in about a mile and cached our and his packs and then worked back down the trail. I tied him to bushes and trees where he could graze near where we worked. Tied a rope between 2 trees and tethered him to this for the night. No grass or brouse was available but he was quiet all night. I plan to feed about  $\frac{1}{2}$  pound of rolled oats and molasis per day.

July 3- Left camp where it was and worked up and downstream about a mile either way. This was a very brushy section and we mostly trimmed willow and small aspen. Burrito grazed along the trail as we worked. I tied him to small trees along the trail. 12 girls in a group and 3 Pingree students passed us, all were impressed with Burrito and several took pictures.

July 4- Moved the camp to the saddle below Signal Mtn. There were many trees across the trail and these we cut as we traveled along. Most of the time I tied Burrito to small trees or limbs for drags in grassy areas. Along most of the route Vaccinium was the only plant available and he readily accepted this. We had to bushwack almost 3/4 mile to get water, this through some rough blowdown. Burrito complained by whining but was able to follow most places, jumping logs and stepping through rocks. After supper we climbed Signal Mtn. and watched fire works in Laramie, Cheyenne, Ft. Collins, Greeley, Estes Park and Denver. Burrito filled up on the alpine plants. He doesn't eat just a single species but tends to sample most everything green. We returned to the camp in the dark.

July 5- Walked the ridge to Donner Pass. At first we had some trouble going downhill because the pack slid forward and sideways. To keep the pack in place we discovered that balance, not tightness of straps, is the most important factor. Also Burrito was taking too big of steps with his hind legs which caused the butt strap to ride up under his tail. As the downhill progressed he slowed his pace and we had no further trouble. We did center the load once in a while. He also drank from a spring today, the first water he has taken in 3 days.

July 6- Today we packed Burrito and worked down to the Miller Fork to spend one night. We put everything we needed on the llama so that all we carried were a shovel, pulaski and 2-man saw. He even carried water. There were some awful blowdowns and it was a tremendous savings in energy just to pick up the lead rope and continue after a cut. In trail maintenance it is not the maintenance work per se that wears a crew down, it is carrying their house with them every step of the way and putting the pack off and on that is tiring. I think that a person who did nothing but walk these trails with the gear we need would be as tired after the week as someone who worked the whole time on waterbars and blowdowns. Burrito saves us much of this carrying work. This evening a porcupine approached our camp from across the stream at about dusk. The llama started making a warning call that sounded like a cross between a whine and a bark. The porcupine turned and left quickly. We have had some problems with porcupines before. This summer we have had ax and saw handles chewed and also a pair of boots. We hope now that the llama will act as a watchdog for our camp and it seems he will. I hadn't foreseen this.

July 7- We climbed back up to Donner Pass today. It was very hot and we had to take it easy. I staked Burrito on a new patch of vaccinium. He's doing well except for being bothered by gnats. This species of gnat is flesh colored, makes a loud buzz and dives at the mouth, nose and eyes. They bother us as much as the llama. I put a little OFF on his ears and that seemed to help, but cigar smoke seems to work the best. We discovered a dry way to ford streams with the llama today. He is not bothered by water at all, so one person crosses on stones or whatever to the other bank. We drop the rope

over his neck and he will ford to the other person. He has walked every bridge we have crossed so far and only needs to ford when there is no human crossing available.

July 6- Loaded for a day hike down Sheep Creek. Again we carried only hand tools. Several very steep sections make the going hard on us and the llama. I have recommended these dangerous sections be rerouted. At the top I took Burrito for some very tough bushwacking over to Lookout Mt. He waited patiently for 30-60 minutes while we surveyed the area from the summit. While there we made a bad mistake. Steve took most of his camera gear from one side of the pack, so while we were gone the unbalanced pack slipped under his belly. He was whining a little when we returned but otherwise no other damage. I've seen mules that litterly would have destroyed both the pack and its contents if the same thing had happened to them.

July 9- Went from Donner Pass to Buckhorn. The trail (?) from Ballard Road to the lower road is miserable for man and beast. It travels almost directly down the side of the hill. Burrito complained constantly but came right on down. He is very sensitive to the members of the group. He doesn't like to leave any member behind or out of sight, especially Graefe. We discovered that the llama is a great garbage disposal, eating orange peels, apple cores and even peanut hulls. One thing to watch for is Burrito's love of rolling in the dust. He seems to get the urge during the hottest part of the day. Usually this is no problem, the packs prevent him from rolling over and he does little more than rub his neck. That is, of course, if he rolls on flat ground. In a hot stand of beetle killed ponderosa south of the station was a different story. Steve and I were sawing a tree. I looked back just in time to see Burrito roll completely over and down the slope below the trail. Luckily he regained his footing after the first time over and was unhurt. Nothing in the pack was hurt either. Just pay attention during the heat of the day. Burrito always paws the ground before he goes down to roll.

July 10- Brenda, Steve and I built a crossing at the Signal Mtn. Trailhead. Burrito entertained and guarded Buckhorn personnel.

July 15- This week there are 3 people's food to carry. Drove my

pickup to Comanche Reservoir. I have a low stockrack, only to the top of the cab to avoid wind drag. I tie Burrito to the front panel, then the front half is his and we pile tools, packs, and food in the back half. There is room in the front for another llama if that were necessary. We left the reservoir and went through the burn and up Beaver Creek. We left most of the larger trees down as we would be back with the YCC later in the week. Again Burrito's agility was most helpful when it came to jumping blowdowns. We are carrying a little bit of our food. Burrito is carrying about 60 pounds. (5 bags of groceries, tent and cooking gear). We camped along Beaver Creek.

July 16- We made a snow crossing above the Beaver Creek cabin. He dug right in, no slips or falling down. On up Beaver Creek Steve and I went along Flowers to Mirror Lake Cut-off. Then over to Willow Creek. This was a cairn building day. I'd tie Burrito to a small rock while I worked. He grazed around there. I heard a bunch of elk bugling and carrying on very near us at lunch time, but the llama didn't seem to notice. His feces and track are so close to an elk's that I imagine most people who see them take them for elk. Tonight I tied him to the end of the lariat and that to a 10 pound drag. He gets tangled but always gets free without much problem. Any weight attached to his lead will hold him as he doesn't pull on his rope much. If he were to be frightened into running away with it the drag would tangle in brush and hold him till I got there, but so far this hasn't happened.

July 17- More cairns as we went over Comanche and down to the ridge just above the tree line before hitting the NPS trail to Mirror Lake. It was very windy at noon, but the llama lay with his back to the wind, seemed quite content. Sometimes when we come to a good view he will balk. Then he will take a good look all around and continue after about a minute. Most times I just slip his lead under my belt so I have both hands free. It is easy to forget he is back there. We camped in the tundra near a bog. Mostly sedges for pasture.

July 18- Spent most of the day in search efforts for Sky Ranch girl. Burrito was content at our camp and we moved him from time to time to spread his grazing. This evening spotted a single doe feeding

a short way from us. Tom and I hid in a bush and fed Burrito out to her on the rope till they were 20 yds. apart. She watched him cautiously for a minute or so then continued feeding. When he noticed her he gave out a lonely little whine which broke our hearts. He couldn't talk her into anything so he went back to grazing also. The doe moved across the meadow and we later saw her with two fawns. A severe storm came in this evening with rain, hail, 40 mph wind and bad lightning. The storm didn't bother Burrito much. He stayed on the leeward side of some little trees. The lightning kept us from going back over Comanche Mtn.

July 19- It was very cold and windy today as we made our way back up Comanche. The wind was so strong at times that we could hardly stand up. We had all of our clothes on to keep warm. It was quite a battle. Burrito was quiet and followed without a complaint. The rope was slack most of the time. We went on down Hourglass Trail to Comanche. Saw a yellow-bellied marmot within 20 feet of the trail. No reaction from the llama. After 3 days on the tundra we are wind chapped and sunburn to the point of blistered noses and bleeding lips. Burrito seems only a little fatter. We met some people from Kansas with 2 horses at the reservoir. The owner was curious about their reaction as we also were so we arranged a meeting. The horse was quite alert but they approached each other, touched noses, and let it go at that.

July 20- Burrito and I packed my camp up into the Comanche Burn area. <sup>spent</sup> We first ~~about~~ about  $1\frac{1}{2}$  hours doing show and tell to all the visitors at the reservoir. Mostly about Burrito; why, where, what and how. I then went back down, loaded up Tom and Steve's gear plus some YCC tools and packed them all up to the burn. That evening I went back again and hauled my family and their gear (plus a case of pop) to my camp.

July 21- The rest of the week Burrito did such things as go with a YCC crew to Comanche Lake to clean up the shore, he carried rock for a wet area above the new foot crossing, and he hauled a tremendous load of garbage down from Maggies' cabin. The pack I have with him works well for items that can be put inside the pouches but bulky things like full-to-overflowing trash bags don't ride well. It was on this trip down on our 10th day out that he spit for the first time since I've worked with him. Spitting is their major form

of expressing displeasure. I felt bad for pushing him to that point after the good work he had done and consider the incident entirely my fault. We also helped out the TSI crew when they came to cut hazard trees in the burn. We had a load I estimated at 60 pounds. We hauled 4 gallons of water, 3 gallons of gasoline, a gallon of oil, hard hats, chaps, daypacks, lunches, cameras and everything else they had except their chainsaws. They were impressed and he carried the load to the top of the burn with hardly a whine. On the way in with this load a group of about 25 Sky Ranch people came up behind us. There were 2 leaders and the rest were between the ages of 7 and 10. They passed me on a switch-back with hardly any room on the trail side and a jagged talus slope on the other. Every kid that passed patted Burrito on the rump and then the head as they went by. With a horse or mule it would have been a very tense situation. The llama didn't move a muscle, he holds very still when younger kids are near. He got a little spoiled around the YCC kids what with grapes, orange peels, oreos etc. etc. They called him Joe Llama. It rained, hailed and blew like crazy on the way out and all the way to Ft. Collins. Burrito loaded up from flat ground this time and I think that with practice he could do this all the time. Usually I backup to a bank.

July 29- First day out. Burrito packed our food, tent, and cooking supplies from Fish Creek to Little Beaver. We saw about 20 head of cattle but neither Burrito or they were much interested.

July 30- Packed up Little Beaver to just above Beaver Bark. We camped at the bottom of the Flowers Trail. While we built waterbars all afternoon Burrito picked in the sparce vaccinium along the trail. This was my first scare. The drag I had him tied to wasn't heavy enough and when I approached him at about 2:00 he ran off down the trail. I assumed he would stop at our camp and we continued working till about 4:30. He wasn't at the camp but I was able to track him back down the trail (with much difficulty) about a mile. I called his name as I walked and when I finally got near him in a stand of lodgepole he answered from about 50 feet off the trail. I caught him with no problem and returned to the camp. It took about 45 minutes to find him. In the future I'll use a bigger drag or follow him immediately if he runs away.

July 31- We continued today on the Flowers Trail from Beaver Park to Maggies Cabin. A total distance of about 7 miles. The first 5 miles are very uphill, very rocky and very tiring. The llama worked well up this although he complained several times. I'm afraid that I was the slow one on this climb though. The last 2 miles are in and out of the tundra along tree line. That is Burrito's favorite area. Picketed him a short distance from our camp. He ate for awhile but began crying while we ate supper around our second fire of the season. Tom moved him closer to us and he lay down within 20 feet of us and seemed content. Llamas are very social animals, and it seems that in the absence of other llamas he has adopted us as his herd buddies. He always seems calmer and more at ease when he is near all of us.

August 1 - Day hiked with tools down through Brown's Lake to Beaver Creek. Made numerous visitor contacts (law enforcement types). Burrito carried everything we needed except tools. Cleared remainder of hazard trees from the burn area. Finished YCC bridge and Burrito crossed it for the final test. As we approached the area where the YCC camped last week the llama seemed to be looking for the kids and was very fidgety when they weren't there. Made several more visitor contacts. He always stands very still and quiet when small children are near. I watch him very closely around kids, but it doesn't seem necessary. On the way back to camp we met 2 pack horses. I warned the people I had a llama and they wanted to see what the reaction would be. There was a very curious approach first, a sniff, and then on with regular business. No problems.

August 2- Worked over to Crown Point Saddle. Made 12-15 visitor contacts. One guy seemed skeptical about the llama, something about good tax money on zoo animals or something along those lines. This is the first not totally positive contact we have this season. We met 2 riders on horseback. I called a possible warning to them. One horse was a little spooked (the man said this was typical) so he rode into the trees a little till we passed. No problems. Talked to many curious and interested people at the trailhead. We returned to camp and moved to the top of Beaver Creek. A bunch of deer were in our camp all night long. They drank out of a pan beside the tent, ate a bite out of an onion, and peered in the door. I couldn't see the deer in the

dark, but Burrito lay quietly as they moved around snorting and pawing the ground.

August 3- Installed a sign Burrito had been carrying at the top of Zimmerman and worked down to the Crown Pt. road by noon. Left the packs there and carried tools down the trail till 4:30. Met Brenda and kids at 5:30. We took Burrito without a pack and he was very spirited on the way back so we all ran up the trail with him in tow. He loped easily along side us. Hamburgers, hotdogs and beer for supper.

August 4- About 6:00 I heard Burrito make the same noise he had at Mirror Lake when calling the doe. I slowly looked around and saw a doe looking at him. She was very curious and approached him in a circle. He called again and she bounded away. 5 minutes later she came back again to circle him, then bound away. This happened 2-3 times more before she left for good. We had all slept out on the ground and I think she would have come closer if we hadn't been everywhere on the ground. Burrito lay down after the first approach and showed very little interest after that. We worked the remainder of Zimmerman to Sheep Creek Reservoir. We dropped packs and took Burrito and the tools up the Crown Pt. Spur and to the top of the hill before the decent into Poudre Canyon. We cached the tools and got back to the reservoir an 5:00. Burrito spent the afternoon feeding along the trail.

August 5- Worked the trail all the way to the Poudre, 6 miles. The last 2 miles are very rocky and steep but Burrito complained very little and had no problems. The bridge across the Poudre has slits similar to a cattle guard which Burrito didn't care for. He crossed anyway on a 12 inch plank. I loaded him and our equipment in my pickup and drove up to the fish hatchery to report a suspected poacher. The DOW people were very impressed with Burrito and I answered questions about him for  $\frac{1}{2}$  hour, both to DOW employees and hatchery visitors. We spent the night at Mountain Park where Burrito clipped the grass and weeds around the trailers. I put a couple of kids on him up to 120 pounds and he held this for me real well. I plan to experiment with a travois later to see if a larger person could be carried that way.

August 6- Burrito loaded in the pickup from flat ground again with no coaxing. He very lightly hangs in T lot man -

Springs trail, Burrito and I walked the Dadd Gulch trail from Crown Point road. I put all my day needs plus radio, shovel, pulaski, and pruning shears on him. I was able to prune with him following with the rope on my belt. All I had to carry was my pen. Made the 4½ miles in 3 hours, that with me working along the way. Although this llama must trot to keep up with a tall man's full stride, a more leisurely pace fits him perfectly and slows the fast trail members down so they can see the work needing done. It is also less tiring. A larger llama could go faster, as Burrito is not full grown and only of medium size for his age. We waited in the meadow north of the bridge for our pickup.

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I spent the final 10 days of the season recuperating from a case of tick fever, so no more outings were made with the llama. This reminds me that, although I have observed ticks on Burrito's guard hairs, I have never found one embedded. I find it hard to believe that ticks don't parasitize llamas but I need to observe this more closely.

**COMMENTS:**

"We spent a total of 30 working days on the trail with the llama plus I have spent about 10 additional days on personal trips and training through the last 6 months. To make an evaluation of the llama I've decided to compare the llama to what I know about horses, mules and backpacking. I have tried to compare both positive and negative attributes although to me the positive far outweigh the negative.

**Safety**

Of course safety is the number one priority when considering any project, especially on the trail in remote areas of the forest. The llama is equipped to be a great kicker and striker but we were never kicked. If he were to kick it would probably hurt alright but he is not big enough to break bones or cause much damage. His light weight (300 lb) and padded feet keep him from crushing feet. He never offered to bite. His agility makes rocky places and rough stream crossings safer for the animal.

**Payload**

One llama of course can not carry as much weight as either a horse or a mule. But when considering weight ratios I figure that a 1200 pound horse would have to carry 400 pounds to compare to the llama's max load. I'm told that Burrito has not reached his full size yet and is an average run of the mill animal, but I consistently was able to carry 60 pounds per day on him. The heaviest load for any distance was 80 pounds. A horse could carry an injured person out where a llama might not be able to. I have had both of my kids ride him (90 lb) and he had held up a 120 pound person for me. I am, however working on a travois system which could be used in an emergency. Now, as hikers, we carried 60-80 pounds of equipment but with the llama and a 3 person crew our heaviest packs could be about 45 pounds. As our food was eaten we shifted our loads to Burrito so that later in the week when our energy reserves were decreasing our loads also were decreasing to where mine occasionally weighed only about 20 pounds. Our diet also changed from dried, light-weight food like macaroni and cheese to canned goods, fresh fruit and vegetables, which help energy reserves and crew health considerably. For a wilderness guard a llama could easily carry everything needed, including papers and more firstaid items.

### Training

Nearly everyone who takes this job is capable of backpacking well enough to do the job. However, very seldom has a crew member had experience with a pack animal of any kind. With a horse a person has to know how to put on the harness and packs (no easy trick) and should be able to repair tack and horse shoes. The llama pack is light nylon with four straps secured with velcro strips. Any repair can be done with needle and thread and no shoes are required. An hour or two of training is enough to explain what to look for and how to pack and care for the animal.

### Visitor Reaction

We meet two kinds of user on the trail; hikers and horseback riders. In the past the hikers have been able to identify with us. We knew their needs, we stepped carefully when following 20 horses down the trail and we've had to scramble up the hill when we've met horses. Prior maintenance of the trail shows the same thing, it has been for hikers. I've thought for sometime that trail crews need an animal if for no other reason than to be able to understand the needs of horse users. Yet a horse crew would alienate hikers. I think the llama is a perfect compromise, appealing to both users. The hikers we met except for one were totally impressed with the llama. The pellets aren't a mess on the trail and there is no threat of being trampled. And we are still on foot and still carrying packs. One horse did shy a little, but in general horse users were as enthusiastic as the hikers and enjoyed comparing beasts. Three or 4 times when we didn't have the llama we had to move completely out of sight of the trail so horses could pass. Our packs seemed to cause more shying than anything. One lady was thrown off on the North Fork Trail because of our packs, which were off the trail and against a tree. The llama attracts immediate attention to us and is a great tool when explaining wilderness ethics.

### Animal Care

A horse requires more than the care of tack and shoes mentioned before. 2-3 pounds of grain or pellets per day and good pasture are needed to keep a working horse healthy. Five-10 gallons of water a day are also needed. Stone bruises and cuts must be doctored and a lengthy stay at high altitudes can cause sickness. A horse trailer

is also needed to transport most animals. On the other hand the llama can do quite well on any brouse found in this area. I fed half a pound of grain per day as a treat more than because it was needed. The llama seemed to prefer to go without water for 2-3 days although water was offered daily. When he did drink it was no more than 1 or 2 quarts. We transported the llama and all of our equipment in a  $\frac{1}{2}$  ton pickup with a low rack. With this load there was still enough room for another llama had that been necessary. Passengers can also be hauled in the same compartment and compact pickups work just as well. The structure of legs and feet prevented even a single cut during this use period.

#### Cost

At this time I don't know what the cost of acquiring a llama for the trail season would be. I do know that purchase prices run slightly higher than they do for good horses. If rental prices were equal for a horse or a llama the llama would still save over 50% on expenses for food and transportation. Over-winter maintenance of a horse would be 3-4 times that for a llama.

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The llama proved to be very intelligent and a hardy packanimal. His docile disposition makes him perfect for inexperienced people and around visitors. He proved himself to me and I think comparable llamas could be a definitely important tool for future backcountry trail crews.